Solid Waste Treatment – End of the Rainbow?

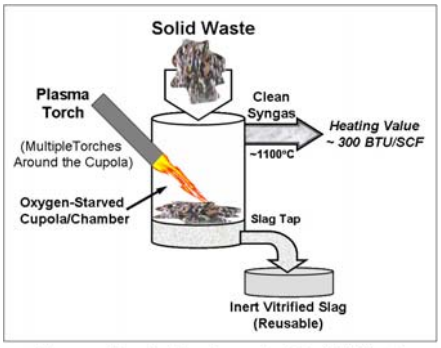
Every day in 2005, U.S. residents, businesses, and institutions produced more than 650,000 tons of municipal solid waste, or about 4.4 pounds of waste per person per day. Approximately 60 percent of this waste went into landfills. For 2005, this amounted to more than 140 million tons of waste landfilled during the year – a staggering amount.

Landfills waste land, waste energy, are environmental hazards and increasingly opposed by citizens living nearby. As for the so-called "modern" lined sanitary landfills, the U.S. Environmental Protection Agency states that "even the best liner and leachate collection systems will ultimately fail due to natural deterioration." This will result in leaching into nearby land and water. At best, liners only delay the leaching problem. Landfills emit methane and are one of the leading manmade contributions to global warming. Landfills also represent a major waste of energy. The U.S. Energy Act of 2005 recognizes municipal solid waste (MSW) as a renewable energy source. Energy in annually generated MSW is nearly ten times that available from wind power.

Is there a solution to these landfill issues? What if there was a technology that is friendly to the environment, could handle any type of waste (except nuclear rods), saves land and allows for the recovery of energy? Solid waste treatment utilizing plasma torch technology accomplishes this and more.

The plasma torch is a mature technology. It has been around since the late 19th century. It is commonly used for welding, metal-cutting and metal-melting purposes. It was used to test the heat shield on the space shuttle during the 1960s. Since that time it has been applied to large volume metal-melting and solid waste treatment.

The flame emitted from a plasma torch exceeds 5000 degrees Celsius, which is hotter than the surface of the sun. When applied to solid waste in an oxygen-starved vessel (cupola), it disassociates the molecules of the organic portion of the waste into basic elements and produces a clean synthetic gas ("syngas"). The syngas has a thermal content about one-third that found in natural gas and can be used to generate steam and/or electricity. If used to produce electricity, the process generates between approximately four times the electricity needed to run the plasma torches. There is no burning in the process – it is not incineration.



Plasma Torch Treatment of Solid Waste

The non-organic portion of the solid waste is converted (vitrified) to an inert lava-like slag which can be used as an aggregate for construction. Metal can also be extracted from the slag or the slag can be converted to rockwool.

There are two successfully operating plasma waste treatment plants in Japan (plus smaller units used for treatment of incinerator ash). One is a plant in Mihama-Mikata that handles 24 metric tons per day. The second plant is a larger facility in Utahinai that has a capacity of 300 tons per day and provides solid evidence of successful plasma treatment of large quantities of municipal solid waste.

Recently, St. Lucie County in Florida selected Geoplasma (located in Atlanta, Georgia) to construct, own and operate a plasma arc torch solid waste treatment facility. It will be operated as a profit making facility. The system will handle 2000 tons per day of generated solid waste and will also treat an additional 1000 tons per day of solid waste in order to reclaim an existing landfill. The plant will produce electricity for sale to the grid and steam for nearby industrial use. The final contract negotiation is nearing completion, and the plant opening is planned for late 2008.

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In Ottawa, Canada, a plasma facility is in construction which will be capable of treating about 90 tons per day of municipal solid waste. In International Falls, Minnesota, there are plans for a 100 tons per day plant which will produce electricity for an industrial park and rockwool for sale as a product.

Waste Not IOWA, Inc. is pursuing this technology to eliminate the need for landfills. We visit communities, political groups, colleges and service organizations to educate citizens about the possible environmental, energy recovery and economics opportunities of plasma torch technology for treatment of solid waste. As St. Lucie County Commissioner Chris Craft said, "The plasma process is bigger than just the disposal of waste for St. Lucie County. It addresses two of the world's largest problems — how to deal with solid waste and the energy needs of our communities." "This is the end of the rainbow. It will change the world."

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